

Plate I. Figs. 1, 4, 6, 6', 7, 7', 8.....Light micrographs. Scales : 10 μ ,
 1', 2, 3, 4', 5, 6'', 6''', 7'', 8'.....Electron micrographs. Scales : 1 μ ,

Haruo OKUNO* : Electron microscopical study on
antarctic diatoms (2)

奥野春雄* : 南氷洋産珪藻の電子顯微鏡的研究 (2)

Rhizosolenia styliformis Brightwell var. **longispina** Hustedt (Pl. I, figs. 1, 1'). Atlas Diat. pl. 316, figs. 5-7 (1914); Kieselalg. 1: 586, fig. 334 (1930); Mills, Index Diat.: 1410 (1934).

L. M. S.** (fig. 1) Frustules elliptic-cylindrical, apical axis about $16-36\mu$ long. Calyptra elongated, straight on the dorsal side and slant on the ventral side. The spine short, at the base somewhat thickened and tubular, with small ears on both lateral sides. Annuli in the form of rhombic scales. Pores on the scales, about 20 in 10μ , arranged in three directions.

E. M. S.*** (fig. 1') A fragment of a frustule was prepared as a direct preparation. Fine structures: The scale is locular. Loculi are arranged in three rows decussating at 60 degrees. The sieve membrane, which I consider to be the outer membrane of a loculus, is very thin, and provided with two parallel longitudinal slits or sieve pores, about $300\text{ m}\mu$ long and $50-70\text{ m}\mu$ broad. The cover membrane, which I consider to be the inner membrane of a loculus, is thicker than the sieve membrane, and has in the centre a round opening about $300\text{ m}\mu$ in diameter. On the calyptra and the girdle of *Rhizosolenia Temperei* (fig. 2), collected off the Gotō Islands, Kyūsyū, Japan, I found similar sieve membranes as in the present variety. The fine structure of the loculi of *Rhiz. Temperei* is shown diagrammatically in Text fig. 1-A. In this species, a loculus is quadrate and a sieve membrane has 1-4 parallel slits or sieve pores. The directions of these groups of sieve pores are different in parts of the frustule.

St. no. 27 (+++); no. 39 (++) ; no. 62 (+).

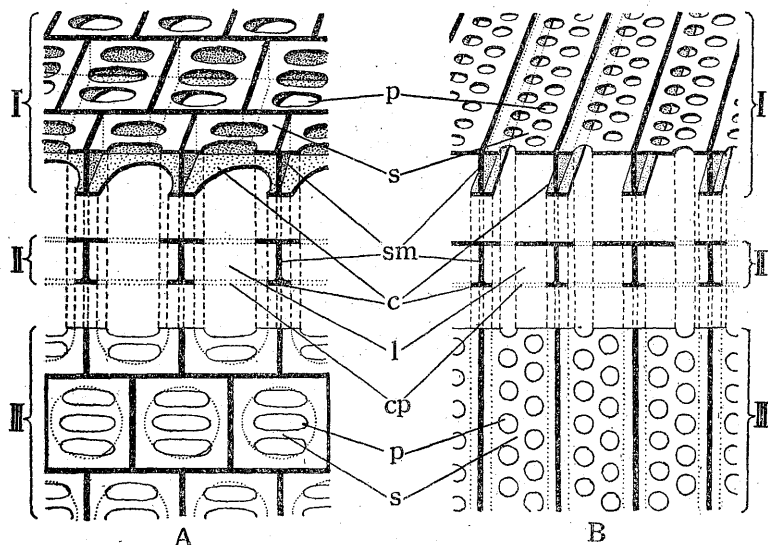
Hemiaulus glacialis Castracane (Pl. I, figs. 4, 4') in Rep. Voy. Challenger, Bot. 2: 100, pl. 25, fig. 4 (1886); Mills, Index Diat.: 843 (1934).

L. M. S. (fig. 4) Valves elliptical, about 20μ long in apical axis, with long parallel processes at the apical end. Processes tapering to the truncate end. The centre of a valve somewhat swollen. The valves areolated, areolas usually polygonal, about 5 in 10μ , arranged in radiating rows.

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** L. M. S. : Light microscopic structures.

*** E. M. S. : Electron microscopic structures.



Text fig. 1. Loculi of *Rhizosolenia Temperei* (A), and *Fragilariopsis antarctica* (B). I. Viewed obliquely from above, partly with the cross-section. II. Cross-section. III. Viewed vertically from above. c. Cover membrane. cp. Cover pore. l. Loculus. p. Sieve pore. s. Sieve membrane. sm. Side membrane.

E. M. S. (fig. 4') A fragment of a process was prepared as a direct preparation. Fine structures: An areola has a thin network sieve membrane. The sieve membrane is likely to be thinner than the valve, judging from its more penetrable character to the electron beam. The meshes of the sieve membrane are about 6-7 in 1μ . Meshes usually polygonal, but their shapes and sizes are very variable. In the present preparation, cellular structure of the valve could not be observed. Sometimes, between the areolas, small areolas without network membrane are found. The fine structure of the sieve membrane of this species somewhat resembles that of *Biddulphia pulchella* shown in Fig. 5. The sieve membranes of these two species are similar to each other by their network structures, but the latter differs from the former by the presence of the incomplete secondary nets in the primary ones. On the valves of both *Achnanthes longipes* and *Isthmia nervosa*, I found somewhat similar network sieve membranes (Bot. Mag. Tokyo, 62: 138, pl. 5, figs. 8, 9; in Rika Ziten, Heibon-Sya, Tokyo, in press)

St. no. 27 (+); no. 39 (+).

Corethron Valdiviae Karsten (Pl. I, figs. 6-6'')

Hustedt, Atlas Diat. pl. 383, figs. 1-8 (1933); Mills, Index Diat. : 451 (1934); Kolbe, Elektronmikr. Diat., Ark. Bot. **33**, A. no. 17: 13, pl. 6, figs. 11, 12 (1948).

L. M. S. (figs. 6, 6') Frustules cylindrical, valves hemispherical, about 15-30 μ in diameter. At one end of a frustule, the spines are long and straight, and at the opposite end, the spines are short, with club-shaped terminals. The girdle is composed of numerous imbricated scales.

E. M. S. (figs. 6'' 6''') An end part of a frustule with long spines was prepared as a collodion preparation. Fine structures: Pores on the scales roundish, about 80 m μ in diameter, arranged in curved and interrupted longitudinal lines. Pores are not locular, but simply penetrate the thin scale. Such a pore not locular, I call a "simple pore" in comparison with the "loculus". Such simple pores were found by me in *Chaetoceros*-valves, *Atteya*-girdle and in several *Pennatae* diatoms. The joints for spines have sieve membranes with simple pores. The pores at the joints are also roundish, about 80 m μ in diameter, occur 3-4 in 1 μ , arranged in longitudinal parallel rows. By the present electron micrograph, it can not be ascertained whether the joints for spines are protuberant or dented. The valve is impenetrable to the electron beam. The long spines are tubular, with porous walls. Pores of the long spines are simple, roundish, arranged in longitudinal rows.

St. no. 27 (+ +); no. 39 (+); no. 62 (+).

Fragilariopsis antarctica (Castracane) Hustedt (Pl. I, figs. 7-7''; Text fig. 1-B) Atlas Diat. pl. 299, figs. 9-14 (1913); Mills, Index Diat. : 722 (1934); *Fragilaria antarctica* Castracane in Rep. Voy. Challenger, Bot. **2**: 56, pl. 25, fig. 12 (1886).

L. M. S. (figs. 7, 7') Cells in long filaments, connecting with valve surfaces. Valves about 17-85 μ long, 7-14 μ broad, linear elliptical or almost linear with rounded ends. Transverse costae parallel, 5-7 in 10 μ , alternating with two or three rows of pores.

E. M. S. (fig. 7'', Text fig. 1-B) Fragments of valves are prepared as a collodion preparation. Fine structures: The valve is locular. Loculi transverse, reaching the margin. In girdle view, the height of loculi is clearly seen (fig. 7'). When observed in the electron microscope, the outer sieve membrane of the loculus is perforated by two, on the margin sometimes by three, alternating rows of sieve pores. Sieve pores are roundish, about 250 m μ in diameter, without secondary micropores in them. The structures of loculi are shown diagrammatically in Text fig. 1-B. Such a sieve membrane transversely broad and with

roundish sieve pores arranged in three directions, commonly occur in *Pinnularia*-valves. And further, on the valves of *Caloneis permagna* var. *elongata*, *Navicula elegans* and *Nav. yarrensensis*, I found similar sieve membranes (Bot. Mag. Tokyo, **62**: 98; **63**: 102, 103). The inner cover membrane is parallel to the outer sieve membrane, and with a transversely broad opening reaching the lateral margins.

St. no. 27 (+); no. 39 (+++); no. 62 (+).

Chaetoceros dichæta Ehrenberg (Pl. I, figs. 8, 8') Hustedt, Kieselalg. **1**: 648, fig. 367 (1930); Mills, Index Diat.: 382 (1933).

L. M. S. (fig. 8) Frustules cylindrical. Valves about $14-42\mu$ in apical axis, slightly convex, in the centre of each valve provided with a spine about $6-12\mu$ long. Near to the apical ends of the valve, originate long spines with somewhat broad bases. These spines or awns proceeding first almost at right angles to the valve surface, and afterward elegantly curve at the interlacing points. On the margin of the valve with a ring of indistinct fine spines.

E. M. S. (fig. 8') A fragment of a valve was prepared as a collodion preparation. Fine structures: The *Chaetoceros*-valves which were hitherto considered to be entirely smooth, are found to be provided with super-fine pores and ribs. The mantle of the valve of this species is very thin, penetrable to the electron beam, with undulating parallel thickenings or ribs. The ribs, about $100-150\text{ m}\mu$ broad, occur 3-5 in 1μ . Between the ribs, minute simple pores about $65-85\text{ m}\mu$ in diameter, are scattered. Such ribs and scattered simple pores were found by me on the valves of *Chaetoceros Lorenzianus* and some other *Chaetoceros*. The *Chaetoceros* cell walls on the whole, I suppose, are not smooth, but porous as in these species. In the present research, spines are not observed, but I suppose they are also tubular and their walls are perforated by simple pores as in other *Chaetoceros* (Bot. Mag. Tokyo, **62**: 138, pl. 4, fig. 12).

St. no. 27 (++) ; no. 39 (+) ; no. 62 (+).

Chaetoceros sp. (Pl. I, fig. 3)

L. M. S. Valves elliptical, about 20μ in apical axis. Spines originate near to the apical end, proceeding almost at right angles to the pervalval axis.

E. M. S. A fragment of a valve was prepared as a collodion preparation. Fine structures: The valve is thin, penetrable to the electron beam, perforated by minute simple pores. Pores roundish, about $50\text{ m}\mu$ in diameter, irregularly scattered. Ribs on the valve are absent.

St. no. 62 (+).

In the present antarctic planktons, beside the species above mentioned,

the following diatoms are also found.

Thalassiothrix longissima Cleve & Grunow: Hustedt, Kieselalg. **2**: 247, fig. 726.

A distinct dominant species at all stations. St. no. 27 (+++); no. 39 (+++); no. 62 (+++).

Amphora sp.

Valves very thin, almost transparent under the light microscope. Striae very fine, about 40-42 in 10 μ . (Okuno, Photo no. 1639). St. no. 62 (++) .

Coscinodiscus lineatus Ehrenberg: Hustedt, Kieselalg. **1**: 392, fig. 204 (1930).

St. no. 62 (+).

Coscinodiscus sp.

Diameter 70 μ . Areolas 7 in 10 μ , arranged in radiating rows. Central area and rosette absent. Marginal zone narrow striated, striae about 20 in 10 μ . (Okuno, Photo no. 1610, 1621). St. no. 39 (++) .

Hemiaulus sp.

Valves 52 μ long, with convex centres. Furrows distinct, septae absent. Processes with broad bases, on one valve apiculate at the end, on the opposite valve truncate at the end. Areolas large, usually polygonal, 3-4 in 10 μ . This doubtful form is very similar to the cell shown likewise as a doubtful form in Schmidt, Atlas Diat., pl. 143, fig. 53. (Okuno, Photo no. 1623) St. no. 39 (+).

Navicula ramosissima Agardh f. *genuina* Cleve, Synop. Nav. Diat. **2**: 26 (1895). (Okuno, Photo no. 1719) St. no. 62 (+).

Pseudonitzschia sicula (Castracane) Peragallo var. *migrans* (Cleve) Peragallo, Diat. Mar. France, pl. 72, fig. 25 (1908); Mills, Index Diat.: 1372 (1934). (Okuno, Photo no. 1627). St. no. 39 (+).

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マルバノハマシャジン (檜山庫三) Kōzō HIYAMA: *Adenophora triphylla* var. *japonica* f. *rotundifolia* Hiyama,

千葉縣銚子犬吠岬の海岸にハマシャジンで葉の圓いものがある。莖梢の葉まで同形で徑 1~2 cm, 花も輪狀に着くが、その枝は殆ど伸びず、萼片は内陸のツリガネニンジンに比べると少し太くて短かい。年々同じ型を持続することは、採集者武井尙氏の年を變えた採品によつて明かであるので、これをツリガネニンジンの一品として記録しマルバノハマシャジンと命名する。

***Adenophora triphylla* A. DC.**

var. ***japonica*** (Regel) Hara in Journ. Jap. Bot. **26**: 281 (1951).

forma ***rotundifolia*** Hiyama, n. f.

Planta tota glaberrima. Caulis circ. 30 cm altus. Folia in nodis caulis omnia cruciata, suborbiculata apice rotundata vel obtusa margine crenata 12-20 mm longa 10-20 mm lata, breviter petiolata. Florum verticilli abbreviatim disposita; calicis laciniae lanceolato-lineares tubum vix superantes integrae vel parcissime calloso-dentatae.

Hab. Hondo: Inubōsaki, Chōshi, prov. Shimōsa (H. Takei, Sept. 16, 1951—in Herb. Mus. Sci. Nat. Tokyo.)